REMARKS

In response to the above-identified Office Action, Applicants have amended claims 1, 4-7, 10-13 and 16-18 and have submitted formal drawings. No new matter has been entered by way of these amendments. In view of these above amendments and the following remarks, Applicants hereby request further examination and reconsideration of the application, and allowance of claims 1-18.

The Office has objected to the drawings asserting that FIG. 2 is illegible. Further, the Office requires the submission of a new FIG. 2. In response, Applicants have submitted concurrently herewith a set of formal drawings. No new matter has been entered. In view of the submission of formal drawings, the Office is respectfully requested to reconsider and withdraw this objection to the drawings.

The Office has rejected claims 4-6, 10-12 and 16-18 under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, the Office asserts the claims contain undefined terms. No new matter has been added by way of these amendments. In response, Applicants have amended claims 4-6, 10-12 and 16-18 to define all of the terms recited therein. In view of the foregoing amendments, Applicants respectfully request the Office to reconsider and withdraw this rejection.

The Office has rejected claims 1-18 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,441,184 to Sonoda et al. ("Sonoda"). The Office asserts that Sonoda discloses a method of interleaving data where data words are interleaved so that all of the data words will be separated by one or more blocks of a carrier (col. 1, lines 37-55); and the data is transmitted to a receiver (col. 3, lines 1-25). In response, Applicants have amended claims 1, 7 and 13 as shown herein and submit the following remarks.

Sonoda does not suggest or disclose "determining a first position of elements of data in an interleaved sequence using a second position of the elements in a source sequence and a number of elements to be skipped," as recited in claims 1 and 7, or "a first interleaving processing system that determines a first position of elements of data in an interleaved sequence using a second position of the elements in a source sequence and a number of elements to be skipped," as recited in claim 13. Applicants respectfully direct the Office's attention to FIG. 6A and col. 4, lines 12-15 in Sonoda, which disclose the words of a

data sequence [W_i] being alternately distributed to form odd data blocks (e.g., W_1, W_3, W_5) and even data blocks (e.g., W_2, W_4, W_5). The words are arranged in the interleaved sequence in Sonoda simply based on whether their initial position in the original data sequence (expressed as a numerical value) was an odd or even number, but are not arranged in the interleaved sequence using each word's position in the sequence and a value representing the number of words to be skipped as claimed.

As discussed at page 6, lines 24-26, in the above-identified application, if data packets are not interleaved before transmission the loss of sequential data packets results in the loss of a large amount of contiguous data. Referring to page 7, lines 17-19, in the application, interleaving data, however, must not introduce more latency than is tolerable by end users and must separate contiguous data sufficiently far apart to make the interleaving scheme effective. The present invention provides a faster and more efficient alternative to prior error correction schemes as disclosed at page 3, lines 9-18. Further, the invention is computationally simple and is easily implemented. For instance, the value representing the number of data packets to be skipped (e.g., K) can be changed "on the fly" in real-time applications to adapt to changing environments whereas other systems (e.g., Sonoda) always arrange the interleaved data in a particular manner resulting in an inflexible system. As a result, the present invention reduces network overhead, improves data transfer quality and reduces latency in networks. In view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejections of claims 1, 7 and 13. Since claims 2-6 depend from and contain the limitations of claim 1, claims 8-12 depend from and contain the limitations of claim 7, and claims 14-18 depend from and contain the limitations of claim 13, they are patentable in the same manner as claims 1, 7 and 13.

Additionally, Sonoda does not disclose or suggest "the interleaving further comprises O(i) = S(h) where h = (i*K)modN, if h is not already a member of H and O(i) = S(h) where h = (i*K)modN + 1 if h is already a member of H," as recited in claims 2 and 8, or "the first interleaving processing system interleaves elements of data in a source sequence so that O(i) = S(h) where h = (i*K)modN, if h is not already a member of H and O(i) = S(h) where h = (i*K)modN + 1 if h is already a member of H," as recited in claim 14. As discussed above in connection with FIG. 6A and col. 4, lines 12-15 in Sonoda, the words of a data sequence [W_i] are arranged in an interleaved sequence based on whether their initial

position in the original data sequence was an odd or even number, and are not arranged in the interleaved sequence using a value representing the number of words to be skipped (e.g., K) let alone adjusting the value representing the words to be skipped. As discussed at page 9, lines 12-20, in the above-identified application, where the value representing the number of elements to be skipped (e.g., K) is not relatively prime with respect to the number of elements being interleaved (e.g., N) some elements may be selected more than once and other may be missed. Thus, the present invention adjusts the number of elements to be skipped (e.g., K) by K+1 when an element is about to be selected a second time. In view of the foregoing remarks, Applicants respectfully submit that claims 2, 8 and 14 are distinguishable over the cited references and are patentable for these additional reasons.

In accordance with 37 C.F.R. § 1.121, attached hereto is a marked-up copy of the changes made to the specification and claims by the current amendment. The version with markings to show changes made is located in the attached Appendix A.

In view of all of the foregoing, it is submitted that this case is in condition for allowance and such allowance is earnestly solicited. In the event that there are any outstanding matters remaining in the above-identified application, the Office is invited to contact the undersigned to discuss this application.

Respectfully submitted,

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APPENDIX A

Version With Markings to Show Changes Made

In reference to the amendments made herein to the claims, additions appear as underlined text while deletions appear as bracketed text, as indicated below:

In The Claims:

Claims 1, 4-7, 10-13 and 16-18 have been amended as follows:

1. (Amended) A method for communications using interleaving, the method comprising:

determining a first position of elements of data in an interleaved sequence using a second position of the elements in a source sequence and a number of elements to be skipped;

interleaving the elements of data in [a] the source sequence according to the determined first position of the elements to form [an] the interleaved sequence, wherein adjacent elements in the interleaved sequence originally were separated by a first number of elements in the source sequence and originally adjacent elements in the source sequence are separated by at least a second number of elements in the interleaved sequence; and

transmitting the interleaved sequence of the elements of the data.

4. (Amended) The method as set forth in claim 1 wherein the interleaving further comprises O(i) = S(h) where h = (i*K)modN, if h is not already a member of H and O(i) = S(h) where h = (i*K)modN + 1 if h is already a member of H, where h denotes a location of one of the elements in the source sequence, H denotes a set of one or more computed h values, N is a number of the elements in the source sequence to be interleaved and is a whole number greater than 4, i denotes a location of one of the elements in the interleaved sequence, S denotes the source sequence, O the interleaved sequence and K is a whole number greater than 1 and denotes the number of elements to be skipped.

5. (Amended) The method as set forth in claim 1 wherein the interleaving further comprises initializing an index number BB to be 0 and then for the sequence i=1 to i=N-1, O(i) = S(h) where h = (i*K + BB)mod N and if h = BB, then add 1 to

BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, S denotes the source sequence, O denotes the interleaved sequence, and K is a whole number greater than 1 and denotes the number of elements to be skipped.

6. (Amended) The method as set forth in claim [1] 2 wherein the de-interleaving further comprises initializing an index number BB to be 0 and then for the sequence i=1 to i=N-1, D(h) = O(i) where h = (i*K + BB)mod N and if h = BB, then add 1 to BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, O denotes the interleaved sequence, K is a whole number greater than 1 and denotes the number of elements to be skipped, and D denotes a de-interleaved sequence.

7. (Amended) A computer readable medium having stored thereon instructions for communications using interleaving which when executed by a processor, causes the processor to perform the steps of:

determining a first position of elements of data in an interleaved sequence using a second position of the elements in a source sequence and a number of elements to be skipped;

interleaving the elements of data in [a] the source sequence according to the determined first position of the elements to form [an] the interleaved sequence, wherein adjacent elements in the interleaved sequence originally were separated by a first number of elements in the source sequence and originally adjacent elements in the source sequence are separated by at least a second number of elements in the interleaved sequence; and

transmitting the interleaved sequence of the elements of the data.

10. (Amended) The computer readable medium as set forth in claim 7 wherein the interleaving further comprises O(i) = S(h) where h = (i*K)modN, if h is not already a member of H and O(i) = S(h) where h = (i*K)modN + 1 if h is already a member of H, where h denotes a location of one of the elements in the source sequence, H denotes a set of one or more computed h values, N is a number of the elements in the source sequence to

be interleaved and is a whole number greater than 4, i denotes a location of one of the elements in the interleaved sequence, S denotes the source sequence, O the interleaved sequence, and K is a whole number greater than 1 and denotes the number of elements to be skipped.

11. (Amended) The computer readable medium as set forth in claim 7 wherein the interleaving further comprises initializing an index number BB to be 0 and then for the sequence i=1 to 1=N-1, O(i) = S(h) where h = (i*K + BB)mod N and if h = BB, then add 1 to BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, S denotes the source sequence, O the interleaved sequence, and K is a whole number greater than 1 and denotes the number of elements to be skipped.

12. (Amended) The computer readable medium as set forth in claim [7] 8 wherein the de-interleaving further comprises initializing an index number BB to be 0 and then for the sequence i=1 to i=N-1, D(h) = O(i) where h = (i*K + BB)mod N and if h = BB, then add 1 to BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, O denotes the interleaved sequence, K is a whole number greater than 1 and denotes the number of elements to be skipped, and D denotes a de-interleaved sequence.

13. (Amended) A system for communications using interleaving, the system comprising:

a first interleaving processing system that determines a first position of elements of data in an interleaved sequence using a second position of the elements in a source sequence and a number of elements to be skipped and interleaves the elements of data in [a] the source sequence according to the determined first position of the elements to form [an] the interleaved sequence, wherein adjacent elements in the interleaved sequence originally were separated by a first number of elements in the source sequence and originally adjacent elements in the source sequence are separated by at least a second number of elements in the interleaved sequence; and

a first communication system that transmits the interleaved sequence of the elements of the data.

16. (Amended) The system as set forth in claim 13 wherein the first interleaving processing system interleaves elements of data in a source sequence so that O(i) = S(h) where h = (i*K)modN, if h is not already a member of H and O(i) = S(h) where h = (i*K)modN + 1 if h is already a member of H, where h denotes a location of one of the elements in the source sequence, H denotes a set of one or more computed h values, N is a number of the elements in the source sequence to be interleaved and is a whole number greater than 4, i denotes a location of one of the elements in the interleaved sequence, S denotes the source sequence, O the interleaved sequence, and K is a whole number greater than 1 and denotes the number of elements to be skipped.

17. (Amended) The system as set forth in claim 13 wherein the first interleaving processing system interleaves elements of data in a source sequence by initializing an index number BB to be 0 and then for the sequence i=1 to 1=N-1, O(i) = S(h) where h = (i*K + BB)mod N and if h = BB, then add 1 to BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, S denotes the source sequence, O the interleaved sequence, and K is a whole number greater than 1 and denotes the number of elements to be skipped.

18. (Amended) The system as set forth in claim [13] 14 wherein the second interleaving processing system de-interleaves elements of data in a source sequence by initializing an index number BB to be 0 and then for the sequence i=1 to i=N-1, D(h) = O(i) where h = (i*K + BB)mod N and if h = BB, then add 1 to BB and add 1 to h, where the index number BB is a whole number, i denotes a location of one of the elements in the interleaved sequence, h denotes a location of one of the elements in the source sequence, N is a number of the elements in the source sequence to be interleaved, O denotes the interleaved sequence, K is a whole number greater than 1 and denotes the number of elements to be skipped, and D denotes a de-interleaved sequence.